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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/613,513

07/03/2003

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EXAMINER

ELVE, MARIA ALEXANDRA

ART UNIT

PAPER NUMBER

3742

NOTIFICATION DATE

DELIVERY MODE

03/20/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-INBOX@AKACHANLAW.COM

<b>Office Action Summary</b>	<b>Application No.</b> 10/613,513	<b>Applicant(s)</b> LIM ET AL.	
	<b>Examiner</b> M. Alexandra Elve	<b>Art Unit</b> 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 29-55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 29-55 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

*In view of the newly discovered reference(s) to Dai et al., Hong et al., Hongo et al. and Smalley et al., prosecution has been reopened. Rejections based on the newly cited reference(s) follow.*

#### ***Claim Rejections - 35 USC § 112***

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 8 states “a set of islands of catalyst”; it is not clear how a set of islands of catalyst can be associated with one die. Is the die very large, are the catalyst areas scattered about?

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 states “all catalyst throughout die”. Is the catalyst on, in or near the die(s)? The independent claim refers to dies, while claim 9 discloses a die.

#### ***Double Patenting***

Claims 1-18 & 29-55 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-36 of copending Application No. 10/613,217.

This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-7, 9, 11-14 & 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbert et al. (US Pat. 6,756,026) in view of Dai et al. (WO 02/081366A1).

Colbert et al. discloses a system in which nanocomponents for nanodevices are made. The system has a mounting element such as a precision translation stage(s) having movement capabilities in the XYZ directions. Mounting requires a minimum of two precision stages. Carbon feedstock gas may be added into the reactor. A catalyst may be formed in-situ using temperatures of 400 to 2000 C. Heat can be supplied in a locally using a laser (e.g. argon), microwave energy, or R-F energy.

Colbert et al. does not teach multiple radiating energy beams (prongs).

Dai et al. discloses an apparatus for the manufacture of carbon nanotubes. The system has substrate which supports nanotube growth (catalyst coated substrates); a localized heating zone within the reaction chamber and gaseous carbonaceous feedstock is feed into the chamber. Suitable heating means include resistant wires, induction field, microwave radiation or infrared radiation. The localized heating zone can also be heated from a remote point by, for example a focused infrared beam or laser

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beam. Temperatures range from 300 to 800°C. Localized heating zones (8) have multiple prongs, as shown in figure 1B below:

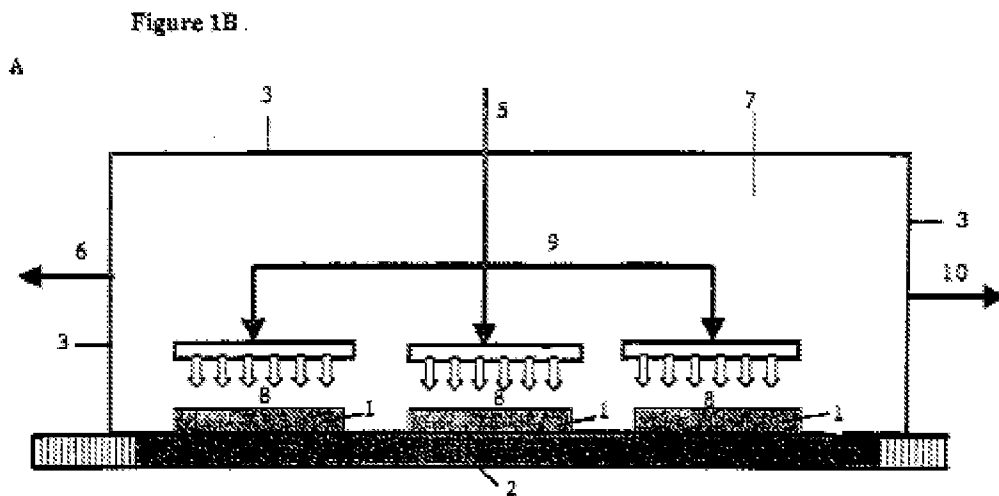


Figure 1B Dai et al. (WO 02/081366A1) shows localized heating zones (8) with multiple heating prongs or laser beam prongs.

It would have obvious to one of ordinary skill in the art at the time of the invention to modify Colbert et al. to use multiple prongs for heating as taught by Dai et al. because it ensures even heating and hence uniform nanotube formation.

Claims 4-5 & 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbert et al. and Dai et al., as stated above and further in view of Glaser-Inbari et al. (USPN 6,801,350).

Although multiple prongs, i.e. multiple laser beams are taught, an actual beam splitter is not taught.

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Glaser-Inbari et al. discloses in FIG. 14, the incoming beam is split into three parts (in an actual embodiment, the number of beams is likely to be larger. FIG. 14 shows only three beams for the sake of clarity). These beams (depicted in FIG. 14 in shades of gray for clarity, though in an actual system they all would have about the same intensity) enter beamsplitter 31, scanner 70, and so on. Because each of the beams has a slightly different angle, they are focused at slightly different locations on the data surface of the disk 24. In practice, **any number of beams, from two to over one hundred, may be used.**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Colbert et al. and Dai et al. to use a beam splitter to form multiple beams because this is a common device used in laser systems for forms multiple beams.

Claims 15-17 & 29-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbert et al. and Dai et al., as stated above and further in view of Hong et al. (USPAP 2002/0127170).

Although the system is used for carbon nanotube fabrication and temperature is disclosed, temperature control is not specifically taught.

Hong et al. discloses an apparatus for fabricating nanotubes on workpieces including a stage for supporting a workpiece, a radiating energy source such as a laser system that emits laser beams that can heat a work region of the workpiece without heating another work region of the workpiece, and a feedstock delivery system. The

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feedstock delivery system has a temperature controller 500 connected to the gas feed line to maintain a temperature such that a catalyst precursor can be injected in gas phase

It would have been obvious to one skilled in the art to use feedstock gas delivery line temperature controller 500 of Hong et al. because this temperature level is critical to the reaction and hence it is required that it be controlled.

Claims 47-49 & 52-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbert et al., Dai et al., and Hong et al. as stated above and further in view of Glaser-Inbari et al.

Although multiple prongs, i.e. multiple laser beams are taught, an actual beam splitter is not taught.

Glaser-Inbari et al. discloses in FIG. 14, the incoming beam is split into three parts (in an actual embodiment, the number of beams is likely to be larger. FIG. 14 shows only three beams for the sake of clarity). These beams (depicted in FIG. 14 in shades of gray for clarity, though in an actual system they all would have about the same intensity) enter beamsplitter 31, scanner 70, and so on. Because each of the beams has a slightly different angle, they are focused at slightly different locations on the data surface of the disk 24. In practice, **any number of beams, from two to over one hundred, may be used.**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Colbert et al., Dai et al. and Hong et al. to use a beam splitter to

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form multiple beams because this is a common device used in laser systems for forms multiple beams.

Although Glaser-Inbari et al. notes that the beams may be at a slightly different angle, it is the position of the examiner that the beamsplitter assembly is capable of generating parallel beams, perpendicular and so forth.

Claims 50-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbert et al., Dai et al., and Hong et al. as stated above and further in view of Smalley et al. (USPN 6,683,783).

Although the formation of nanotubes is disclosed, the application of an electric/magnetic field is not taught.

Smalley et al. discloses carbon fiber formation (nanotubes) in which an electromagnetic field is applied to orient the nanotubes during growth.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electromagnetic field as taught by Smalley et al. in the Colbert et al. system because this orients the nanotubes, forming arrays.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892.



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 7:30-4:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu B. Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 15, 2009.

/M. Alexandra Elve/  
Primary Examiner, Art Unit 3742

/TU B HOANG/  
Supervisory Patent Examiner, Art Unit 3742